

“IMPROVED HAMMOCK AND SPREADING ROD”

FIELD OF THE INVENTION

THIS INVENTION relates to a material for use in furniture, particularly
5 outdoor furniture. More specifically, the invention extends to material for use in
hammocks and hammock chairs and includes those items when made from the material.
The invention also extends to a method of decorating a hammock or hammock chair by a
printing process, particularly when used for promotional indicia. The invention also
extends to a flexible or semi-rigid spreading rod for use in a hammock and a hammock
10 incorporating the spreading rod.

BACKGROUND OF THE INVENTION

Hammocks have been in use for hundreds of years. It is generally accepted
that the hammock originated in Central America approximately 1,000 years ago and was
created by the Mayan Indians. The earliest hammocks were produced by weaving the bark
15 of trees.

As a result of pre-existing trade routes, the hammock found its way
throughout Central and South America. The original web-like hammock also eventually
gave rise to a cloth or fabric hammock.

Hammocks were introduced to Europe by Colombus. They then became
20 adopted by seafarers, particularly of Britain, and France. The Europeans generally relied
on canvas cloth for their hammocks and this means of bedding was used by the British
Navy for three centuries.

Hammocks were introduced into the British prison system during the 1800s
and were usually supported by looped ring ends which were hung over two spaced hooks
25 for use. They were then removed or either simply hung off one hook for storage when not
in use.

The hammock has become an established means of comfortable support
either for resting or for use as a bed. It is estimated that over 100,000,000 people use
hammocks as beds or furniture everyday and these people are distributed throughout
30 Africa, China, Philippines, South Pacific, Central and South America, North America and
Europe.

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Most hammocks are today made from hemp or cotton. The use of cotton in hammocks is a relatively new event in the history of the item and began only in the last 50 to 60 years. A problem that arises, particularly with cotton, is that when used outdoors, the material tends to absorb moisture, either from sweat or the atmosphere, and begin to rot
5 relatively quickly.

Synthetic materials, such as nylon and polyester, have been tried, particularly in outdoor hammocks, as they do not absorb moisture and are highly resistant to rot. The major problem with these items is that they tend to lack a significant comfort level because they do not absorb sweat, they feel clammy and as they have no or little
10 natural "give", they tend to be regarded as too hard by users.

Hammocks are generally woven from cotton, nylon and polyester. The woven cotton hammocks have a small degree of stretch capabilities because of the inbuilt stretch characteristics of cotton yarn. Nylon and polyester yarn do not stretch and therefore woven hammocks made from these materials are very rigid and uncomfortable.
15 Cotton absorbs moisture, nylon and polyester do not, and are therefore "sweaty" in use.

The ability to stretch according to body pressure is an important factor in hammocks. Individual cotton fibres stretch, not only in the material of the hammock bed, but also in the supporting cords. The combined stretch factor of the bed and the cords give the cotton hammock its comfort level, which is regarded by many as superior. Synthetic
20 materials, as conventionally used, do not stretch and hammocks made from these types of substances are traditionally regarded as not very comfortable.

Reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that this prior art forms part of the common general knowledge in any country.

SUMMARY OF THE INVENTION

Throughout this specification, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element or integer or group of elements or integers but not the exclusion of any other element or integer or group of elements or integers.

In a first aspect, the invention resides in a fabric for use in furniture, particularly outdoor furniture, the fabric formed, at least in part, from a synthetic material

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wherein the synthetic material is woven or knitted to provide a stretch characteristic of from 5% to 50%.

Preferably, the synthetic material is warp knitted. The fabric may have an interlocking weave pattern adapted to provide the preferred stretch characteristics.

5 The synthetic material may comprise one or more of nylon, polyester, polypropylene, polyethylene or a suitable polyolefin material. The synthetic material may comprise a blend which includes a component of a natural material such as cotton. The cotton may be present at up to 50% of the blend.

10 Most preferably, the fabric has a first stretch characteristic in a first direction and a second greater stretch characteristic in a second direction which is substantially perpendicular to the first direction.

The stretch characteristic in the first direction may be any suitable percentage but is preferably 10% or less.

15 The stretch characteristic in the second direction may be any suitable percentage greater than that of the first direction but is preferably from 10% to 50%. Most preferably, it is from 20% to 40%.

20 In a preferred embodiment, the fabric has a plurality of ventilation holes. The ventilation holes may be distributed in any pattern but are preferably distributed in a regular pattern. The ventilation holes may be present in sufficient number to provide a ratio of material/holes of 80%/20% or 70%/30%.

The ventilation holes may vary from 2mm to 50mm in diameter when formed as circles. Preferably, they are formed around 5mm in diameter. They may be formed in any suitable shape. One preferred shape is slit-like or ellipsoidal.

25 In a further aspect, the invention resides in a hammock or hammock chair comprising fabric of the present invention. Preferably, the fabric is arranged to have its first direction with lesser stretch characteristics aligned, in use, along the head to tail axis of a user and its second direction with greater stretch characteristics aligned transverse to the head to tail axis of a user. The invention may reside in a hammock formed of material of the present invention, the fabric having its first direction of a lesser stretch characteristic
30 aligned along the length of the hammock and its second direction of a greater stretch characteristic aligned across the width of the hammock.

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The fabric may be printed with visible indicia. The indicia may include text and/or graphic elements. The indicia may be adapted to identify ownership of the hammock or hammock chair, or advertise products and/or services. The indicia may be personalised for an owner. The indicia may be used in promotional activities, club membership identification and loyalty promotions.

In a further aspect, the invention may reside in a spreading rod for a hammock or hammock chair wherein the spreading rod is formed as a flexible or semi-rigid elongate member. The elongate member is preferably adapted to deform under ordinary loads experienced in a hammock or hammock chair and to an extent compatible with comfortable use of the hammock or hammock chair while assuming its undeformed configuration when not under load.

The spreading rod may have a plurality of apertures dimensioned to receive supporting cords. Alternatively, the spreading rod may be formed integrally with or supported directly by a frame support of a hammock or hammock chair. The flexible elongate member may be formed from one or more of plastic, rubber, spring steel or other suitable material.

The flexible member may be formed from wood with cuts in one side positioned to allow flexion under load with the elongate member retaining adequate strength to support a person or persons in a hammock or hammock chair. The elongate member may be formed from a polyvinyl chloride (PVC) plastic tube, preferably with a diameter of from 10mm to 30mm.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of a piece of fabric of the present invention;

FIG. 2 shows the fabric of FIG. 1 with its longitudinal stretch characteristic highlighted;

FIG. 3 shows the fabric of FIG. 1 with its transverse stretch characteristic highlighted;

FIG. 4 shows a top and side view version of one embodiment of a warp knitted fabric;

FIG. 5 is a perspective view of a hammock formed according to the present invention and including printed indicia;

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FIG. 6 is a perspective view of a hammock and support stand including a spreading rod of the present invention;

FIG. 7 shows the arrangement of FIG. 6 when under load;

FIG. 8 shows a part-sectional perspective view of a spreading rod, support
5 cords and hammock end.

DETAILED DESCRIPTION OF THE DRAWINGS/PREFERRED EMBODIMENTS

Referring to FIG. 1, there is shown a section of fabric 10 which is produced from a synthetic material or synthetic/natural fibre combination. The synthetic material is preferably fibres of polyester, polypropylene or polyethylene. Other synthetic materials
10 may be suitable for the present application and a suitable polyolefin polymer material may be utilised. A blend of cotton and a synthetic material as is known to people of skill in the art may also be utilised. The material is preferably knitted or woven with an interlocking weave pattern which allows for a stretch characteristic to be built into the fabric. In the present invention, a stretch characteristic represents the ability of the material to stretch
15 under load and a percentage indication represents the percentage of increase provided at maximum stretch. The fabric comprises material 12 with apertures 13 formed and spread throughout. The apertures may be formed in any suitable shape, preferably compatible with usual manufacturing processes. In the present example, the apertures or ventilation holes are shown as spaced ellipsoidal holes. The shape of the apertures themselves may
20 provide some degree of differential stretch. The degree of extension of the holes in the direction of arrow 14 is less than that available in the direction of the arrow 15. Along lines of force including the apertures 13, the degree of stretchability or stretch characteristics will therefore vary. The apertures in their own right may be used to provide differential or varying stretch characteristics in different directions.

25 In FIG. 2, the material 10 is shown with the stretch characteristics highlighted by arrows 16, 18 in a first direction up or along the long axis of the fabric 10. The ability to insert stretch characteristics is known in the knitting and weaving industry. Warp knitting is a relatively recent technique which allows the variability to be spread uniformly or, as shown in FIG. 2, provided in bands 19, 20, 21 while other bands 22, 23
30 remain somewhat bunched but also extend as required to provide suitable stretchability.

FIG. 3 shows the fabric 10 when stretched in a second direction which is

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substantially transverse to the direction of FIG. 2. The stretch characteristic in this direction are more pronounced giving a differential characteristic between the first direction 16, 18 of FIG. 2 and second direction 25, 26 of FIG. 3.

The difference between the stretch characteristics may be altered as suitable for individual purpose. The weave pattern and stretch characteristics may vary dependent on the hammock application. Generally speaking, it is preferred to have a hammock, for example, with a minimum stretch at no more than 10% length ways but with 10% to 50% stretch in the second direction or width. The interlocking weave pattern can be varied, as known in the weaving and knitting art, to suit different hammock applications.

The fabric comprises an interlocking knitted construction pattern used to modify the stretch characteristics. The ventilation holes may be knitted into the fabric at regular intervals to facilitate breathing of the fabric and also allow cooling circulation of air to flow through the material in use.

Warp knitting has developed a reinforcement technique in which the key reinforcements are locked in with a skeleton of knit fibres which can be oriented in longitudinal and/or transverse directions. Warp knitting represents the fastest method of producing fabric from yarns. It differs from weft knitting in that each needle loops its own thread. The needles produce parallel rows of loops simultaneously that are interlocked in a zig zag pattern. The fabric is produced in sheet or flat form using one or more sets of warp yarn. The yarns are fed from warp beams to a row of needles extending across the width of the knitting machine. Two common types of warp knitting machines are the Tricot and Raschel machines. Raschel machines are useful because they can process all yarn types in all forms (filament, staple, combed, carded and others). Warp knitting may sometimes be referred to as warp weaving.

While warp knitting is a preferred method for producing the material, any other method known to a person skilled in material manufacture may also be recruited for the purpose.

Weft knitting, on the other hand, uses one continuous yarn to form courses or rows of loops across a fabric. There are three fundamental stitches in weft knitting: plain-knit, purl and rib. On a knitting machine, the individual yarn is fed one or more needles at a time.

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In FIG. 4, an example of warp knitting is shown. This is by way of example only and should not be regarded as providing a limiting example or even an appropriate or applicable example for the fabric of the present invention. The shown pattern represents a multi-axial, multi-ply fabric demonstrating two diagonal yarn sets 28, 29 overlaid on two
5 biaxial yarn sets 30, 31 locked together by looping yarn 32.

Furniture incorporating the fabric of the present invention can be provided with desired or preferred stretch characteristics as required. FIG. 5 shows a preferred embodiment of use of the fabric of the present invention in the form of a hammock 35 supported between two trees 36, 37. Support cords 38, 39 are tethered to the trees 36, 37
10 and run out to a spreading bar or rod 40, 41 respectively, which are located in corresponding sleeves 42, 43. The sleeves are continuous with the body of the hammock 44 which is formed with a plurality of ventilation holes 45 evenly spread over the surface of the body 44. The hammock has stretch characteristics along its length of up to 10% but transverse stretch characteristics of between 10% and 50%. The material could have a
15 minimum proportion of around 70% solid material and 30% ventilation holes. Preferably, the ratio of solid material to holes is around 80% to 20%. The holes may be uniform in size or may be varied in size and shape throughout the body 44.

The hole size and shape may be a factor in the stretch characteristics of the material. The hole size and shape may be aligned so the bed material has limited stretch in
20 the first direction and pronounced stretch in a transverse direction. The holes in the fabric open and close dependent on body pressure applied at the spot or region of a particular hole. By making the hole oval, rectangular or an elongated diamond shape, the stretch factor may be controlled in either direction. Preferably, the longer axis of the hole is parallel to the length of the hammock and the shorter axis parallel with the width of the
25 hammock to give the hammock a stretch factor of different characteristics in the different direction.

The hammock 35 has a visible graphic device 48 which, in this case, is a low sun and island scene. Synthetic materials are better able to receive printed application. Cotton fails to hold printing which tends to run and fade dramatically, particularly in
30 sunlight. On a synthetic surface, simple and well known printing techniques may be used to provide a whole range of visible scenes. In one form, the scenes may be provided as

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uniform and colourful indicators of ownership such as the name of a hotel chain, the trade mark of a manufacturer or colour coordinated renditions to provide an attractive scene on, for example, a beach. A particular club or other group of like-minded people may obtain hammocks which indicate their club loyalty such as, for example, to a sporting club, a travel or adventure club. Appropriately decorated hammocks may be used as promotional material for upcoming events or provided to, for example, attendees at a conference or similar. Printed representations of favoured celebrities such as actors or pop personalities may be rendered onto the surface of the hammock therefore providing additional appeal and idiosyncratic effect to a person's hammock. In one embodiment, hammocks may be personalised by printing specifically for an individual consumer with, for example, their name, photograph of their pet, or a preferred scene from a book or Internet source. For each purpose, the indicia may be regarded as relevant indicia.

FIG. 6 shows a representation of a hammock 50 and support frame 51. The hammock has a body 52 and support cords 53, 54.

The support cords 53 run onto a spreading rod or bar 55, 56, respectively. Opposite ends of the support cords 53, 54 are supported on uprights 57, 58 of the support frame 51. The uprights run into a common horizontal member 59 which, in turn, is supported by feet 60, 61. In this view, the spreading rods 55, 56 are substantially straight and undeformed.

A view of the same arrangement as FIG. 6 is seen in FIG. 7 under load from an occupant 62. The spreading rods 55, 56 are adapted to deform, as shown, under load. By using a non-rigid spreading bar, the hammock bed is allowed to flex at the point of most pressure achieving a more comfortable hammock while still opening up the hammock bed. The spreading of the load also avoids wear points which become noticeable with rigid horizontal spreading rods with holes drilled at spaced intervals to receive cords. The purpose of the spreading rod is to spread the hammock fabric so it does not collapse during use. Rigid rods do not bend because the load bearing is taken by the supporting cords which are threaded through the rigid rod spreader directly to the hammock fabric.

The spreading rods of the present invention are located in a sleeve which is load bearing thereby spreading the weight from the fabric pocket to the supporting cords. The flexible or semi-rigid spreading rod may be made from any suitable material such as

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plastic, rubber, spring steel or other flexible material. A timber rod may be used with flexibility introduced by a series of cuts made along one edge to facilitate bending away from and opening up of the cuts.

5 In one embodiment, a polyvinyl chloride plastic tube of 10mm to 30mm diameter may be used. Drill holes may be positioned at spaced intervals along the length of the tube which is preferably of 0.5m to 1.5m length. Supporting cords may be passed through the holes of the tube and tied off in a knot large enough to avoid withdrawal through the hole. If the PVC tube is not suitably flexible, shallow cuts may be located along the length of the tube sufficient to improve the flexibility while maintaining adequate
10 strength to support the hammock and occupant. All supporting cords are preferably cut to a similar length.

A closer view is seen in FIG. 7 where the cords 70, 71, 72 are all passed through respective holes, one of which is shown in outline 73. The cords are fixed in place by knot 74 which is large enough to lodge against the aperture 73 and resist withdrawal.
15 The rod 75 is located in its own sleeve 76 which is formed from one end 77 of the fabric. In operation, load is applied to the fabric which in turn is transmitted through the sleeve to the spreading rod 75. The spreading rod 75 deforms to a suitable extent under load so that the load is distributed through the cords 70, 71, 72 preferably in a substantially even manner so that wear on the sleeve and the cords is minimised by an even spread.

20 Throughout the specification, the aim has been to describe the preferred embodiments of the invention without limiting the invention to any one embodiment or specific collection of features. Those of skill in the art will therefore appreciate that, in light of the instant disclosure, various modifications and changes can be made in the particular embodiments exemplified without departing from the scope of the present
25 invention. All such modifications and changes are intended to be included within the scope of the appendant claims.